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Engineering Design File

PROJECT FILE NO. 020996

Staging, Storage, Sizing and Treatment Facility

Electrical Load Study

Prepared for:
U.S. Department of Energy
Idaho Operations Office
Idaho Falls, Idaho

Idaho National Engineering and Environmental Laboratory

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07/24/2001
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ENGINEERING DESIGN FILE

1. Title: SSSTF Electrical Load Study

2. Project File No.: 020996

3. Site Area and Building No.: INTEC

4. SSC Identification/Equipment Tag No.: SSSTF

5. Summary:

The electrical loads for the SSSTF were evaluated and it was determined that electrical power be supplied to the SSSTF from the 12.47 kV overhead line that runs along Lincoln Blvd. There are no requirements for standby power or emergency power other than that required for Life Safety Systems. A 500 kVA transformer will be provide with a secondary voltage of 480 Volts. Power will be distributed throughout the SSSTF at 480 Volts. Smaller transformers will be provided to supply 208/120 Volts for convenience receptacles and other loads requiring 120 or 208 Volts. This EDF will document the design decisions.

6. Review (R) and Approval (A) and Acceptance (Ac) Signatures:
(See instructions for definitions of terms and significance of signatures.)

	R/A	Typed Name/Organization	Signature	Date
Performer		John E. Duggan, PE 6770	John E Duggan	8/01/01
Checker	R	William H. Reed, PE 67A0	W H Reed	8/01/01
Independent Peer Reviewer	R	M.H. Doornbos, PE 6710	Martin H Doornbos (CORE Chair)	3/8/02
Approver	A	William H. Reed, PE 67A0	W H Reed	8/01/01
Approver	A	C.J. Hurst, PE 6790	C J Hurst	3/6/02
Requestor	A	R.L. Davidson 6250	R. L. Davidson	3/7/02

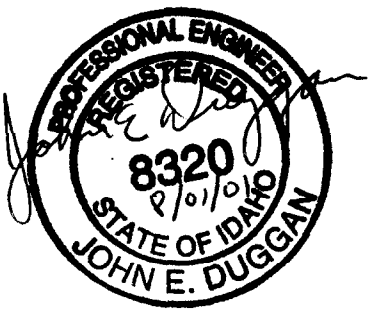
7. Distribution:
(Name and Mail Stop)

8. Records Management Uniform File Code (UFC):

Disposition Authority: Retention Period:

EDF pertains to NRC licensed facility or INEEL SNF program?: ☐ Yes X No

9. Registered Professional Engineer's Stamp (if required)



MAIN BODY

Power for the SSSTF will be supplied from the 12.47 kV line that runs along the east side of Lincoln Blvd which is located to the west of the proposed site. The line is supplied from Scoville Substation and is strictly normal or commercial power. There are no requirements for standby power, and self-contained battery backed units will supply emergency power for life safety systems. The power will be transformed from 12.47 kV to 480 Volts and distributed throughout the SSSTF. The main distribution panel will be rated to provide 600 Amperes at 480 Volts. The SSSTF Administration Trailer, Decon Facility, Head Bolt Heater Rack Panel and ICDF will be supplied from this distribution panel. Details of the loads in the Decon Facility and the Head Bolt Heaters are shown in the panel schedules. The Admin Trailer load was specified in the Procurement Specification which was based on standard value of 20 watts per square foot. The 50 kW to be supplied to the ICDF was based on a request from ICDF Engineering.

The major SSSTF load is the Decon Facility. The Decon Facility distribution panel will be rated to provide 400 Amperes at 480 Volts. The bulk of the power supplied to the Decon Facility will be used for heat. Six heaters totaling 81 kW will be located in the Decon Bay. Seven heaters totaling 94.5 kW will be located in the Treatment Area. Two heaters totaling 60 kW will be located in the mezzanine area above the Admin Area. Two duct heaters totaling 20 kW will be located in the exhaust ducting. Lighting in the Decon Bay will consume 4.3 kW while lighting in the Treatment Area will consume 3.3 kW. Lighting and heat in these areas will be supplied from the 480 Volt distribution panel. Other 480 Volt loads include exterior lighting totaling 700 watts, exhaust fans totaling 14.8 kW and the decon water lift station totaling 2.4 kW. The remainder of the loads are supplied from a 208/120 Volt panel rated at 100 Amperes via a 45-kVA transformer supplied from the 480 Volt distribution panel. The loads on this panel include 6.4 kW of heat in the Admin Area, approximately 2 kW of lighting in the Admin Area and 5 kW for the water heater. Miscellaneous loads and receptacle allowances account for 9.8 kW

The main distribution panel supply to the Heat Bolt Heater Rack Panel is at 480 Volts. The panel contains a 480 – 208/120 Volt transformer, which supplies 120 Volt power to the head bolt heater receptacles. Power to the panel is controlled by a thermostat, which will provide power only when the temperature falls below a preset value.

The following loads were used to calculate the size of the transformer supplying the main distribution panel.

SSSTF Administration Trailer	40.0 kW	(Procurement Spec Requirement)
Decon Facility	304.5 kW	(From Panel Schedule)
Head Bolt Heater Rack	15.6 kW	(From Panel Schedule)
ICDF	50.0 kW	(From ICDF Engineering)
Total	410.1 kW	

410.1 kW plus a 25% contingency equals 512.6 kW. The closest standard size transformer is 500 kVA, which is being specified.

Without applying diversification factors, 90 kW is available for future treatment.